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02/01/99  
jc530 U.S. PTO

Box Patent Application  
Assistant Commissioner of Patents  
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

jc518 U.S. PTO  
09/24/97  
02/01/99

Transmitted herewith for filing is the patent application of :

Inventor(s): Marc Hamel and Daniel J. Seguin

For (title): DISPOSABLE TIP MAGAZINE

1. **Type of Application**

- ☒ Utility  
☐ Design

2. **Benefit of Prior U.S. Application(s) Under 35 U.S.C. §120**

This application is a:

- ☐ Divisional  
☐ Continuation  
☐ Continuing Patent Application (CPA)  
☐ Continuation-in-part (CIP),

and hereby claims benefit under 35 U.S.C. §120 to the following applications:

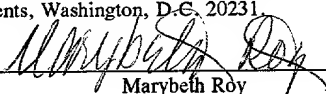
SERIAL NUMBER	FILING DATE
None	

3. **Benefit of Non-U.S. Application Under 35 U.S.C. §119(a)-(d)**

This application claims priority under 35 U.S.C. §119(a)-(d) to the following foreign application(s) and/or inventor certificate(s):

**CERTIFICATE OF EXPRESS MAIL UNDER 37 C.F.R. §1.10**

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date February 1, 1999 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL223400126US addressed to the: Assistant Commissioner of Patents, Washington, D.C. 20231.

  
Marybeth Roy

COUNTRY	APPLN. NUMBER	FILING DATE
None		

Certified copy(ies) of the application(s) and/or inventor certificate's from which priority is claimed:

- ☐ is(are) attached;  
☐ will follow.

**4. Benefit of Provisional Application Under 35 U.S.C. §119(e)**

This application claims priority to the following provisional application(s):

SERIAL NUMBER	FILING DATE
None	

**5. Papers Enclosed Which Are Required For Filing Date Under 37 C.F.R. §1.53**

5 Pages of Specification, including claims

3 Sheets of Drawing

**6. Additional Papers Enclosed**

- ☒ Declaration and Power of Attorney  
☐ Preliminary Amendment  
☐ Information Disclosure Statement (37 CFR 1.98), Form PTO-1449 and a copy of each cited reference  
☒ Assignment and Form PTO-1595  
☒ Small Entity Declaration  
This application is assigned to Matrix Technologies Corporation  
☐ Declaration of Biological Deposit  
☐ Submission of "Sequence Listing" computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequences.  
☐ Other \_\_\_\_\_

**7. Application Filing Fee Calculation**

- A. ☒ Utility Application

FEE CALCULATION:

Total Claims: 6 - 20 = 0 × \$18 = \$ 0  
Independent Claims: 1 - 3 = 0 × \$78 = \$ 0

66F020" 26444260

Basic Fee: .....\$ 760  
Multiple-Dependent-Claim Fee : .....\$

Total of the Above Calculations: ..... \$ 760.00

- ☐ Amendment canceling extra claims enclosed.  
☐ Amendment deleting multiple dependencies enclosed.  
☐ Fee for extra claims is not being paid at this time.

B. ☐ Design application - \$310 \$  
Application Filing Fee Sub-Total ..... \$  
C. ☒ Less 50% reduction for small entity..... \$-380.00  
D. ☐ Non-English Specification - \$130..... \$

**TOTAL FILING FEE ..... \$ 380.00**

**8. Payment**

- ☒ Enclosed  
☒ Check in the amount of the Total Filing Fee set forth above.  
☐ Charge Account No. 19-0079 in the amount of Total Filing Fee set forth above. A duplicate of this transmittal is attached.  
  
☐ Not Enclosed

**WARNING:** If no fees are to be paid at the time of filing the application, the following paragraph must be deleted.

The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§1.16 and 1.17 that may be required by this paper or any paper filed in connection with this Patent Application, or refund any overpayment payable to Samuels, Gauthier & Stevens, LLP at the address set forth below.

Respectfully submitted,



Arlene J. Powers  
Reg. No. 35,985  
Samuels, Gauthier & Stevens LLP  
225 Franklin Street, Suite 3300  
Boston, MA. 02110  
(617) 426-9180  
Extension 110

09241497-020499

**VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS****Serial No.:** Unknown**Group No.:** Unknown**Filed:** Herewith**Examiner:** Unknown**For:** DISPOSABLE TIP MAGAZINE**Applicant:** Marc Hamel et al.

I hereby declare that I am an official of the following small business concern and am empowered to act on its behalf:

Matrix Technologies Corporation  
22 Friars Drive  
Hudson, NH 03051

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons.

For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third-party or parties controls or has the power to control both.

I hereby declare that rights under contract or law to the application filed herewith have been conveyed to, and remain with, the above-identified small business concern.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern, or organization having rights to the invention is listed below and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

I acknowledge the duty to file, in this application, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small business entity is no longer appropriate.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC §1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: George P. Kalmakis

TITLE OF PERSON SIGNING: Senior Vice President of Engineering and Operations

ADDRESS OF PERSON SIGNING: 22 Friars Drive  
Hudson, NH 03051

SIGNATURE: 

DATE: 1/31/99

**UNITED STATES PATENT APPLICATION**

**of**

**Marc Hamel**

**and**

**Daniel J. Seguin**

**for**

**DISPOSABLE TIP MAGAZINE**

09241497-020199  
667020-644260

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

This invention relates to automated pipetting systems, and is concerned in particular with  
5 the provision of a low-cost disposable magazine for loading pipette tips into such systems.

### 2. Description of the Prior Art

This invention is especially adapted for, although not limited to, use with the  
PLATEMATE™ pipetting systems marketed by Matrix Technologies Corp. of Hudson, New  
10 Hampshire, U.S.A. Such systems employ rigid metal magazines such as aluminum, for the  
pipette tips. The steel magazines are expensive components and are thus continually reused in  
successive pipetting cycles. Magazine reuse inevitably requires laboratory personnel to frequently  
empty and refill them with fresh pipettes. This has been found to be a time consuming, inefficient  
and cumbersome procedure, but one that was deemed necessary because of the belief that only  
15 steel magazines could provide the rigidity required to resist deflection during the pipetting process.

During the pipetting process, in order to ensure a uniform seal across all of the pipette tips  
in the magazine, substantial force must be exerted on the magazine. If the magazine is not rigid  
enough, there will be some deflection across the face of the magazine.

It is important that the magazine be as flat as possible. If there is too much deflection, all  
20 of the faces of the pipette tips will not adequately seal, causing an air leak and thus uneven  
pipetting. The automated pipettor may be used to dispense samples into 96, 384 or 1536 well  
plates. It is extremely important that the pipettes be perpendicular to the magazine. If there is

too much deflection and the pipette tips are slightly angled, the sample will be pipetted into an incorrect well or on a wall causing cross contamination. Precision is especially required when using the 384 or the 1536 well plates.

The objective of the present invention is to provide an improved low-cost pipette magazine  
5 which may be discarded after a single use, thus accordingly, alleviating the drawbacks associated with the prior art reusable magazines.

### SUMMARY OF THE INVENTION

The present invention stems from the discovery that a pipette magazine of adequate rigidity  
10 and stiffness can be molded from a polymeric material, with the attendant reduction in costs being such that the magazine can be economically discarded after a single use.

### BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of the present invention will become more apparent  
15 as the description proceeds with reference to the accompanying drawings, wherein:

Fig. 1 is a top plan view of a pipette tip magazine in accordance with the present invention;

Fig. 2 is a bottom plan view of the pipette tip magazine;

Fig. 3 is a front view of the pipette tip magazine;

20 Fig. 4 is a left side view of the pipette magazine;

Fig. 5 is a sectional view taken along line 5-5 in Fig. 1; and



Fig. 6 is a schematic illustration of a pipetting system and its arronated pipette tip magazine.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

5 A preferred embodiment of a pipette tip magazine in accordance with the present invention is generally depicted at 10 in the accompanying drawings. As shown somewhat schematically in Figure 6, the magazine 10 is adapted for insertion into the pipetting chamber "C" of an automated pipettor. The chamber has a generally U-shaped ledge configured to support the magazine in an operative pipetting position, as well understood by those skilled in the art. The magazine 10 has  
10 a generally rectangular configuration having a front edge 12a, side edges 12b, 12c and a rear edge 12d surrounding an inner region 14. The edges 12b, 12c and 12d are undercut as at 13 to be supported on the ledge of the chamber. The inner region 14 has an array of through openings 16 for vertically receiving and retaining pipette tips. A handle 18 protrudes from the front edge 12a to facilitate manual placement and removal of the magazine in the pipetting chamber C.

15 It has been found that the magazine 10 can be molded from a polymeric resin with sufficient inherent stiffness such that when the magazine is supported in its operative position on edge 11, a downward force of up to approximately 1000 Newtons exerted on the inner region 14 will cause less than .51 mm of deflection, but preferably less than .38 mm of deflection at the point of force application, assuming the magazine was substantially flat when molded. Preferably,  
20 the polymeric resin will comprise a polycarbonate, which may include a filler such as glass fiber.

The percentage of glass fiber to the polymeric material is preferably in a range of approximately 20 to 40 weight percent. Because the magazine is molded from a filled polymeric resin, it is

relatively inexpensive, and thus may be discarded after a single use. Thus, the magazine may be supplied already filled with pipette tips and disposed after usage, thus obviating any need to resort to cumbersome time consuming reloading.

Preferably, the inner region 14 of the magazine comprises approximately 85% of the total surface area, with the remaining 15% comprising the edge region overlying the undercut 13 adapted to be seated on the ledge 11.

Typical dimensions for a suitable magazine are:

Total surface area:	98.5 cm <sup>2</sup>
Width of undercut 13:	.51 cm
Area supported on ledge 11:	14.3 cm <sup>2</sup>
Maximum thickness:	.90 cm

Bosses 22 may be included on the underside of the magazine to assist in the stacking of loaded magazines for packaging, such that they are easily displaced one from the other.

The foregoing description has been limited to a specific embodiment of the invention. It will be apparent, however, that variations and modifications can be made to the invention, with the attainment of some or all of the advantages. Therefore, it is the object of the claims to cover all such variations and modifications as come within the true spirit and scope of the invention.

What is now claimed is:

1           1. For use in an automated pipetting system having a pipetting chamber with a generally  
2 U-shaped ledge, a pipette tip magazine adapted for insertion into and removal from an operative  
3 position in said chamber supported on said ledge, said magazine comprising a generally rectangular  
4 plate having an edge surrounding an inner region, said edge being configured to be supported on  
5 said ledge, and said inner region having an array of through openings for vertically receiving and  
6 retaining pipette tips, said plate being molded from a polymeric resin and having an inherent  
7 stiffness such that when supported on said ledge, a downward force of up to about 1000 Newtons  
8 applied to said inner region will produce a downward deflection of said plate at said geometric  
9 center of not more than .51 mms.

1           2. The pipette tip magazine of claim 1, wherein the polymeric resin is polycarbonate.

1           3. The pipette tip magazine of claim 1, wherein the polycarbonate is filled with glass  
2 fiber.

1           4. The pipette tip magazine of claim 1, wherein the amount of glass fiber is approximately  
2 20 to 40% by weight of the polycarbonate.

1           5. The pipette tip magazine of claim 1 wherein the edge is between 10 to 15% of the total  
2 area of the plate.

1           6. The pipette tip magazine of claim 1 wherein said magazines when filled with pipette  
2 tips are stackable.

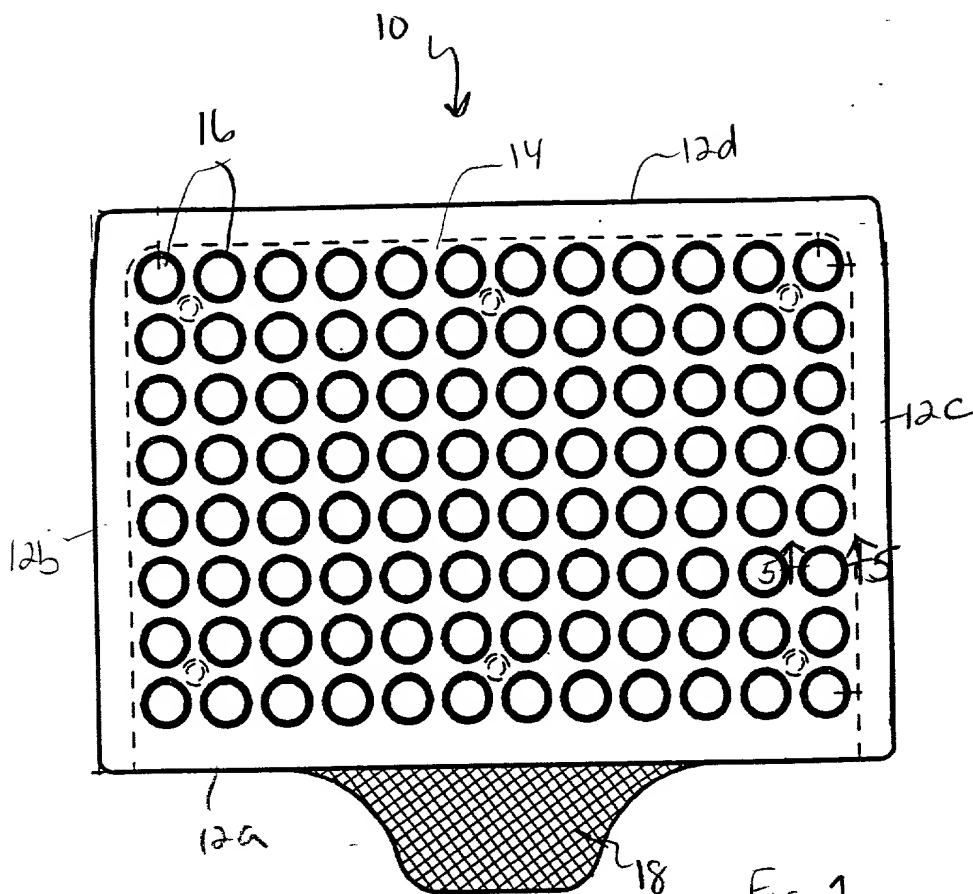


Fig 1

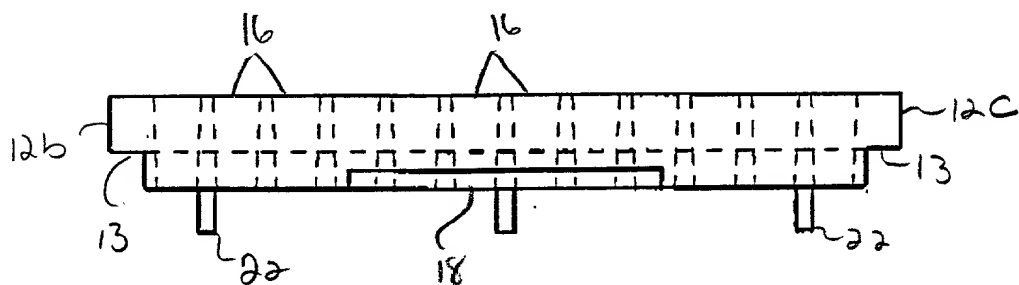


Fig 3

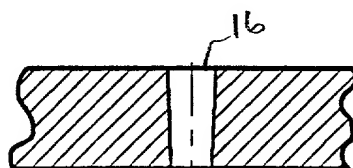


Fig 5

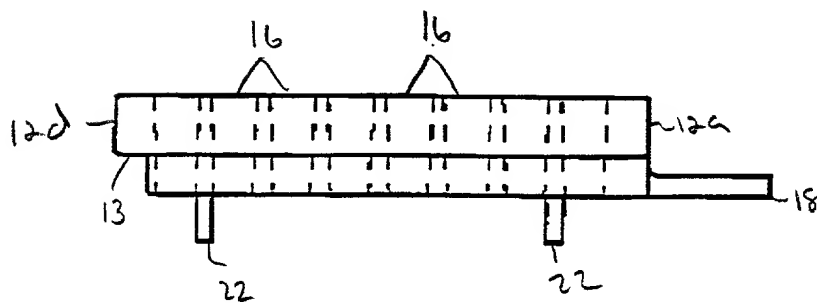
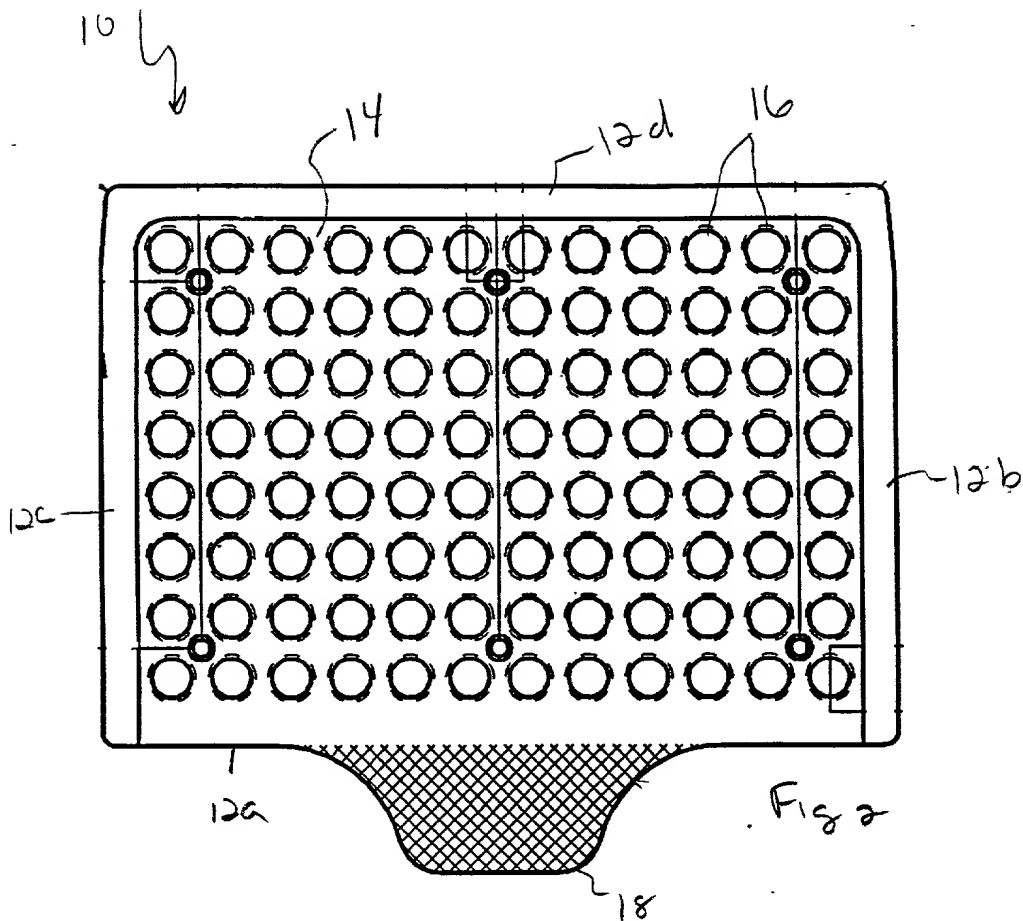
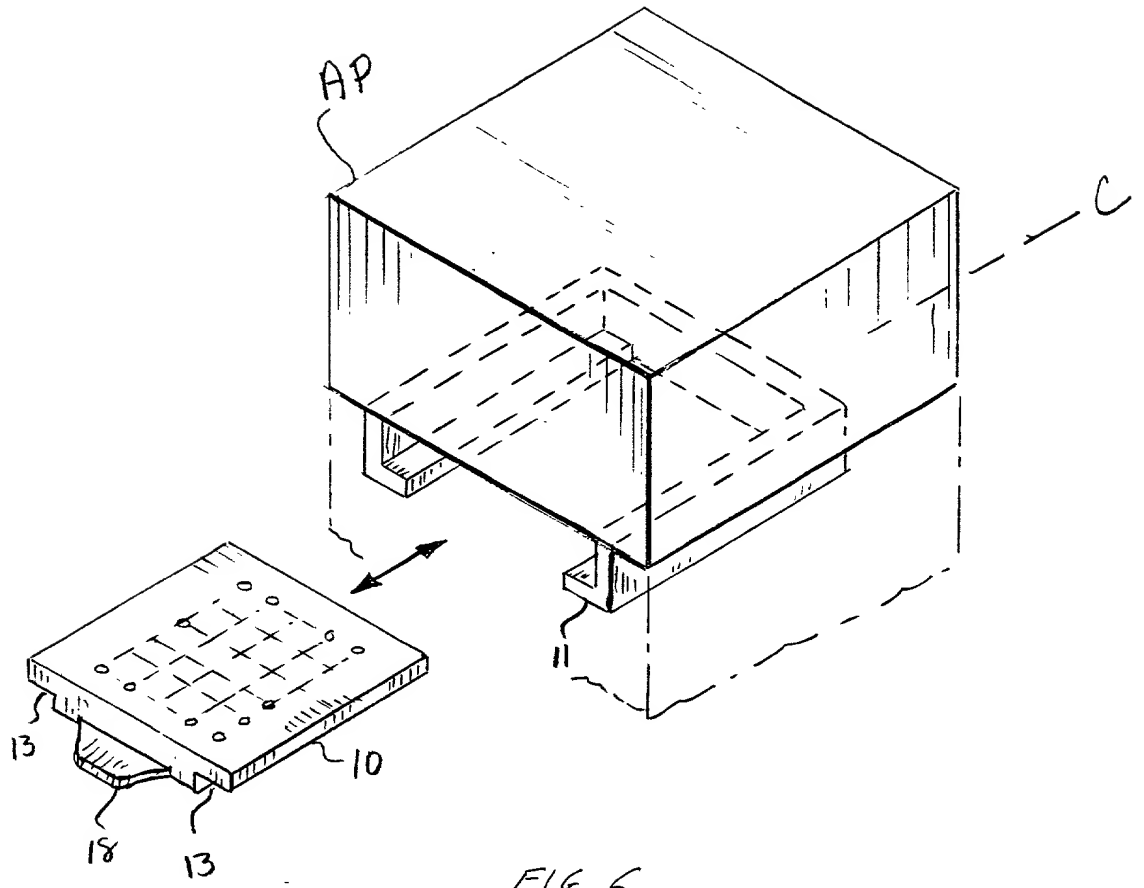


Fig 4



## DECLARATION AND POWER OF ATTORNEY

We, the below named inventors, hereby declare that:

Our residences, post office addresses, and citizenships are as stated below next to our respective names.

We believe we are the original, first, and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled **DISPOSABLE TIP MAGAZINE**, the specification of which is attached herewith.

We hereby state that we have reviewed and understand the contents of the above identified specification, including the claims.

We acknowledge the duty to disclose information which is material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56.

We hereby declare that all statements are made hereby of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And we hereby appoint:

Maurice E. Gauthier	-	Reg. No. 20,798
Richard L. Stevens	-	Reg. No. 24,445
Matthew E. Connors	-	Reg. No. 33,298
Arlene J. Powers	-	Reg. No. 35,985
William E. Hilton	-	Reg. No. 35,192
Patrick J. O'Shea	-	Reg. No. 35,305

all of the firm of Samuels, Gauthier & Stevens, our attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

667020-2674250

We request that all correspondence be directed to:

Samuels, Gauthier & Stevens  
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Attn: Arlene J. Powers

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